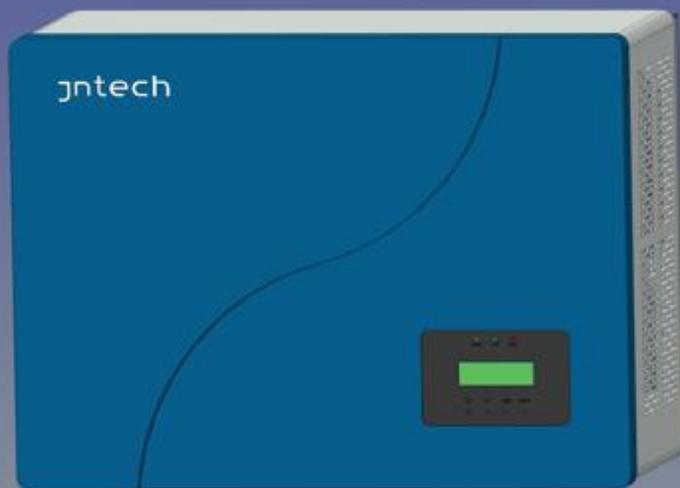




G.P.T.CO

PV Off Grid Inverter with
Hybrid Controller
User Manual



Hefei Jntech New Energy Co.,Ltd.V1.0



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1.Safety Instruction

1.1 Safety identification

The following safety symbols may be used in this manual, and the meanings are shown in below.

Safety Symbol	Meaning
 Danger	Means that it may lead to serious accident of injuries, if safety warning is ignored.
 Warning	Means that it may lead to serious accident of injuries, equipment serious damage or main business interruption, if safety warning is ignored.
 Notice	Means that it may lead to moderate accident of injuries, equipment moderate damage or part of the business interruption, if safety warning is ignored.
 Danger	Means that if connect polar wrong, will cause machine damage
 Note	Means that the content is additional information.

Inverter related symbol

Symbol	Meaning
	Direct current (DC)
	Alternating current (AC)
	Protective grounding
	Refer to relevant instructions
	Can not discard inverter together with domestic garbage
	Beware of dangerous high-voltage. Be careful in operation.
	CE certification marks. It means that inverter complies with the requirement of CE certification.

For the electrical and electronics equipment, safety relates to the whole process of installation, commissioning, operation and maintenance. Therefore, incorrect use or operation would damage the life and personal security of operating person or the third party, and inverters.

In order to reduce casualties, damage of inverter and other equipments, user or operating person should strictly abide by all the safety information tips of danger, warning and notice which are in the process of operating and maintaining.

1.2 Safety instruction



Warning!

All the installation operation on the machine must be completed by the professional and technical personnel. The professional and technical personnel shall:
- through specialized training.

Please read this manual and master the operation of the relevant security matters completely.

If not in accordance with the manual installation and operation of the machine is damaged. It will not be in the scope of the warranty.

① Before installation



Notice!

When you receive the product, please check the damage of the whole machine during the transportation. If you find any problems, please contact Hefei Jntech new energy Co.,Ltd. or transportation company immediately

② Installing

Ensure inverter not have electrical connections and electricity before installing.



Warning!

If inverter damage caused by the following circumstances will be beyond the warranty scope of our company.

- The photovoltaic array configuration, ensure the DC side short-circuit current in the machine within the allowable range, otherwise it may cause irreversible damage to the machine.
- The photovoltaic array configuration, ensure each PV string open circuit voltage should not exceed 140V, otherwise it will cause irreversible damage to the machine
- The improper selection of the installation environment of the machine will affect the performance of the machine and may cause damage to the machine
- Do not install the machine in flammable, explosive or flammable and explosive articles are stored place
- Do not install the machine in an explosive place
- Do not install the machine in areas where lightning strikes may occur
- Do not install the inverter in place where have much salt fog.
- When running the inverter, please ensure good ventilation.
- Inverter should be installed erectly, and ensure the heat sink, fans etc. are without shelter.

Electrical connection:



Warning!

- All the operation and wiring work should be operated by professional electrical or mechanical engineer.
- Please do not close any circuit breakers until all devices are fully connected



Notice!

- All electrical installation must comply with local and national electrical installation standards.
- In order to ensure the safe operation, require proper grounding, the use of appropriate size conductor and provide short circuit protection necessary.
- the connection cable must select the appropriate specifications, firm connection and good insulation.

2. Production Introduction

2.1 Household PV off-grid Power Generation System Introduction

Household PV off-grid power generation system consists of PV array、 solar mounting structure、 storage battery、 Grid (Diesel Generator) 、 PV off-grid inverter with controller and conventional household loads. Use PV solar panel transform solar energy into electrical energy, meanwhile use solar controller store electrical energy into battery, inverter can transform battery's DC power into 115V AC power and 230V AC power to drive household loads work.

This system can meet the demands of electric power in the areas that without grid electricity or lack of electricity.

Meanwhile, in the area of having Grid power and Diesel Generator input, the system can manage power automatically, which ensure household loads work regularly and reduce use-cost.

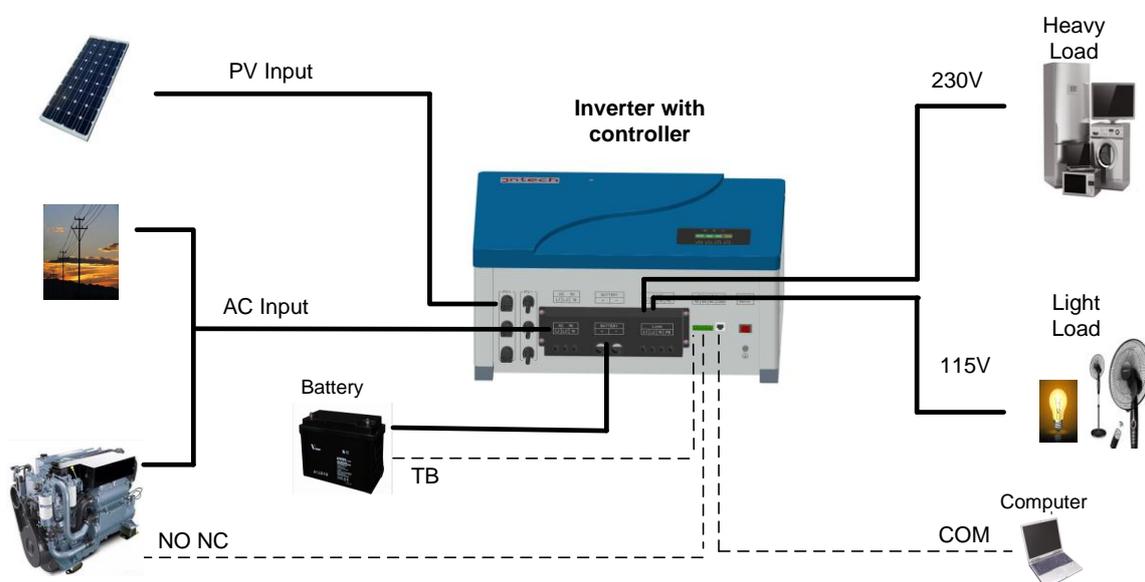


Figure 2-1 Domestic Used Off Grid Power System Exploded View

2.2 Production Introduction

2.2.1 Appearance Introduction

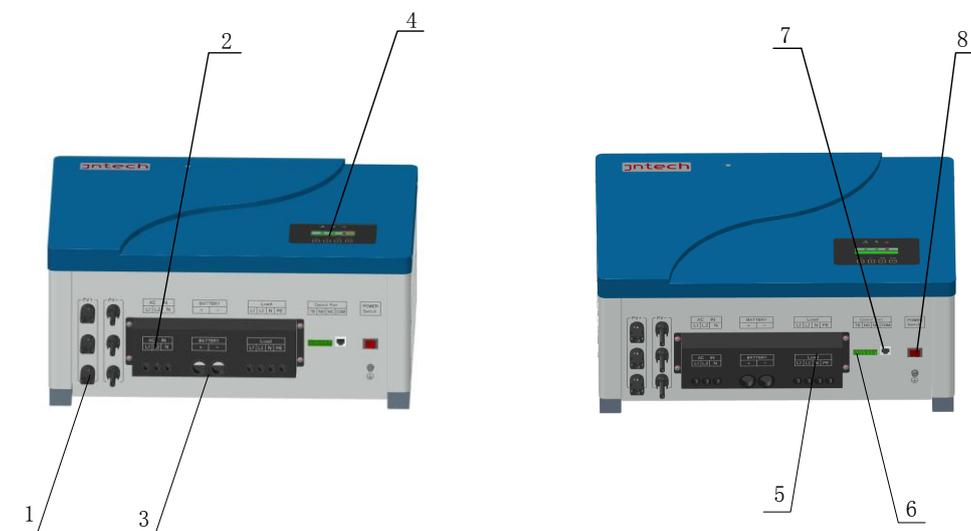


Figure 2-2 Production Appearance

Diagram2-1 Production Appearance Information

Serial Number	Name	Description
1	PV Input	Input terminals, connect with PV array.
2	AC Input	Connect with grid power or Diesel Generator.
3	Battery Terminals	Connecting with battery array.
4	LCD display	Display current working status and parameter modify functions.
5	AC output	AC loads output: L1 is light load output firing line, L2 is household heavy load firing line, N is AC zero line, PE is ground protection line.
6	Control Interface	TB is the connecting interface of temperature sensor, be used to monitor battery's temperature to prolong battery lifespan; NONC is dry contactor control terminal, for example can connect with diesel generator and control its start.
7	Communication Interface	RS485 communication function, can connect with communication transform equipment, to monitor the working status of the whole system.
8	Power Button	Inverter & Controller's power button

2.2.2 Production Dimensions

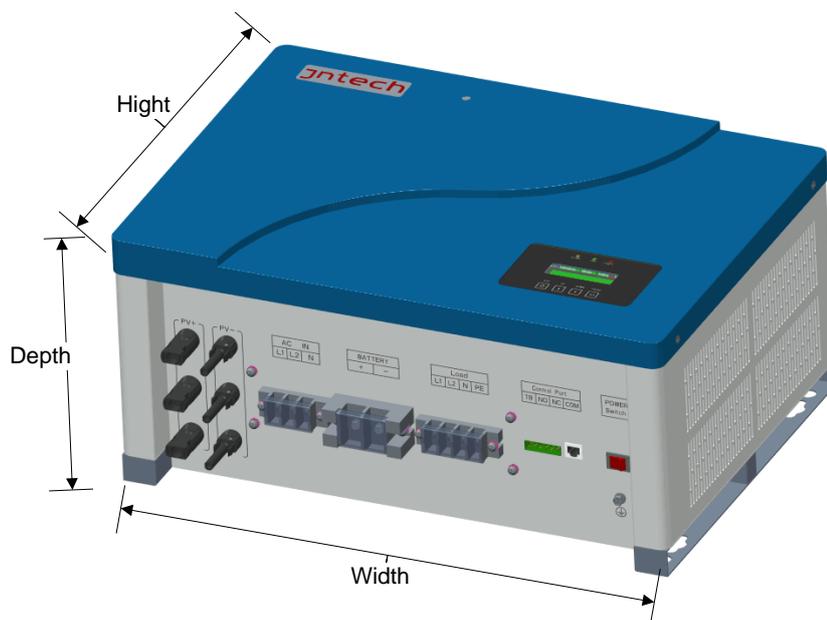


Figure 2-3 Inverter & Controller Dimensional Drawing (mm)

Diagram 2-2 Inverter & Controller Size and Weight Sheet

NO.	Model No.	W(mm)	H(mm)	D(mm)	W(kg)
1	JNF1KLF-A/24V	485	365	235	17
2	JNF1K5LF-A/24V	485	365	235	18
3	JNF2KLF-A/24V	485	365	235	27
4	JNF3KLF-A/48V	485	365	235	28
5	JNF4KLF-A/48V	500	365	235	30
6	JNF5KLF-A/48V	500	365	235	35

3. Inverter & Controller Unpacking Installation

3.1 Unpacking Inspection

To ensure system installation goes smoothly, pls do checking before unpacking. Specific inspection items are as follows:

- Checking whether the outer packing is in good condition.
- Unpacking, and checking up the products damage or not.
- Contrast to packing list, to check whether all accessories is correct and in good condition.

Standard inverter & controller and some common used accessories are as follows, specific models and qty. please check up with installation list.

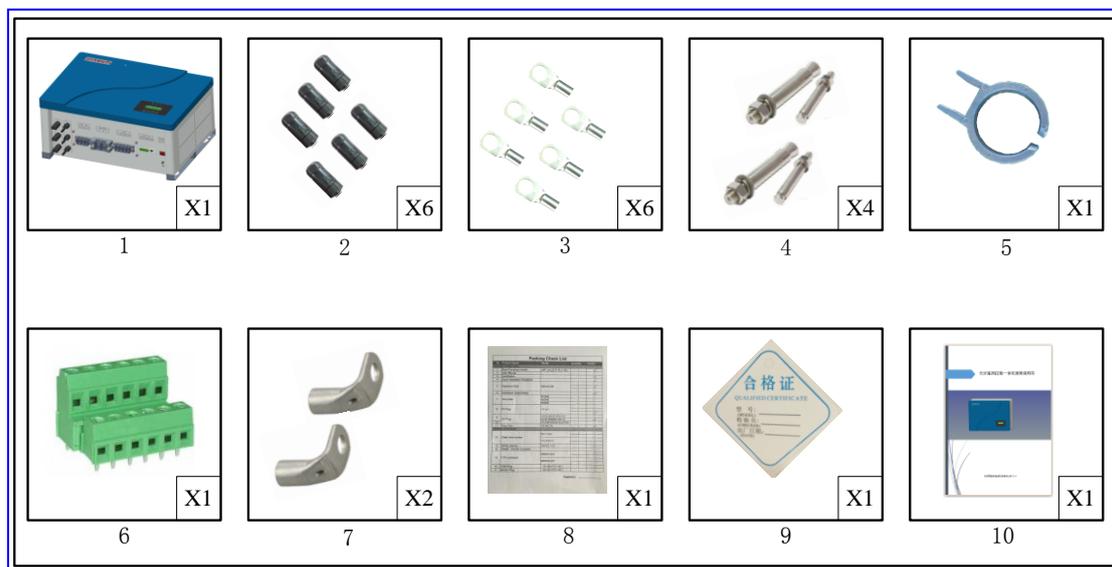


Figure 3-1 Inverter & Controller and standard parts

Diagram 3-1 Inverter & Controller and Accessories sheet

Serial No.	Illustration	Dispatch status
1	Inverter & Controller	Standard configuration
2	MC4 PV connector	Standard configuration
3	Cool pressing terminal	Standard configuration
4	Expansion bolts	Standard configuratin
5	PV connector dismounting tools	Standard configuration
6	Phoenix terminal	Standard configuration
7	L type terminal in battery side	Standard configuration
8	Installation list	Standard configuration
9	Certificate	Standard configuration
10	User manual	Standard configuration

3.2 Prepare Installation Tools

Inverter & controller installation and guide line installation tool are as follows, installation workers need to use tool as per request of follow sheet without any mistake.

Diagram 3-2 Installation Tool List

Diagram sketch	Name	Recommended spec.	Function
	Flat screwdriver	Φ2	use for cable installation
	Cross screwdriver	φ4	use for cable installation
	hydraulic tongs	M2.5~M8	use for cool pressing terminal installation
	Crimping Pliers	M2.5~M8	use for connecting with battery terminals
	Monkey spanner	300mm	use for nut assembly, inverter& controller installation
	Impact drill	φ8	use for drilling hole and inverter & controller installation
	wire stripping pliers	M1.5~M8	use for connecting PV cable
	hammer	6Pounds	use for tunking setscrew

3.3 Hanging-mounted Installation

Inverter & Controller's hanging-mounted installation should be controlled the angle range of vertical and horizontal be 80 °-90 °, as follows,

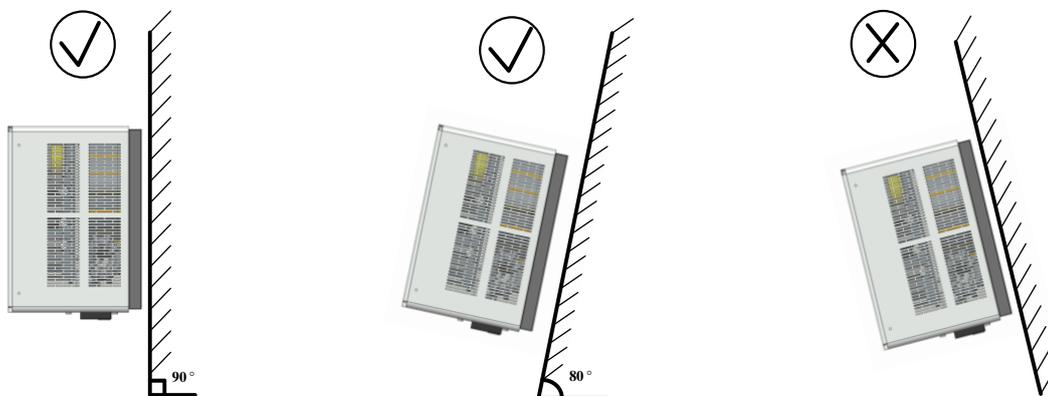


Figure 3-2 Hanging-mounted Installation Demonstration Figure



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Step 1: Please check the installation situation, to ensure its convenient installation and heat dissipation, we suggest leave up and down gap size at least 300mm, while right and left side each 500mm, front side 300mm.

Step 2: Mark up the installation hole, according to it, drill 4 holes (Diameter: 10mm; Depth: 80mm). As shown in the figure:

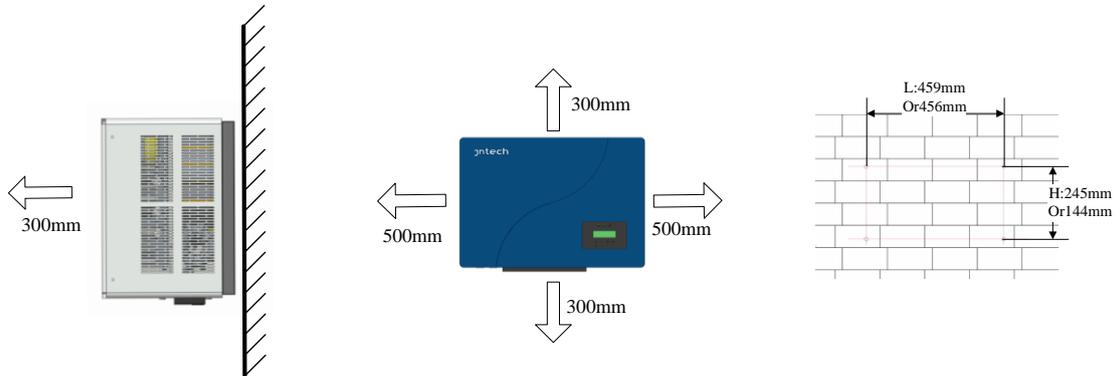


Figure 3-3 Hang position diagram

Follows are wall hanging sizes of different inverter & controller models:

Diagram 3-3 Fixed position sizes chart

Fixed position size	Model of Inverter & Controller
L: 459mm H: 245mm	JNF5KLF-A/48V
L: 454mm H: 200mm	JNF1KLF-A/24V JNF1K5LF-A/24V JNF2KLF-A/24V JNF3KLF-A/48V JNF4KLF-A/48V

Step 3: Refer to follow installation method to finish the installation.

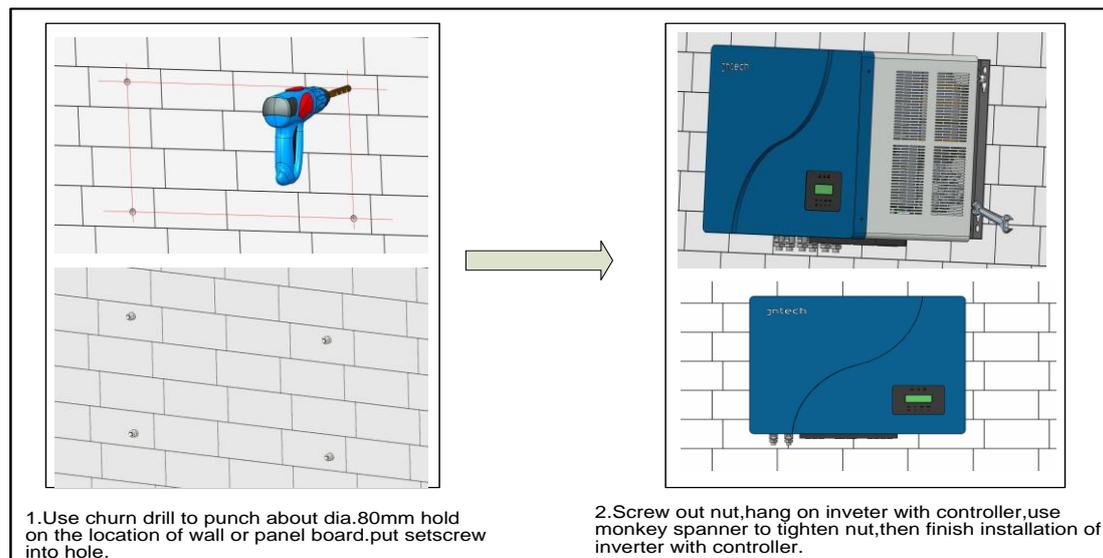


Figure 3-4 Installation operation diagram

3.4 Electrical connection

Under the condition of the meet the installation conditions, can carry on electrical connecting operation. Please ensure electrical connection's air-switch and cable model can meet system demands, specific selection model sheet are as follows:

Diagram 3-4 Air-switch and cable model selection

Model No.	Air-switch selection (C)					Cable selection (AWG)				
	PV	AC	BAT	Load1	Load2	PV	AC	BAT	Load1	Load2
JNF1KLF-A/24V	25	10	40	6	6	10	15	7	16	16
JNF1K5LF-A/24V	25	16	63	10	10	10	13	6	15	15
JNF2KLF-A/24V	25	16	80	16	16	10	13	5	13	13
JNF3KLF-A/48V	50	25	63	16	16	8	10	6	13	13
JNF4KLF-A/48V	63	32	80	20	20	6	9	5	12	12
JNF5KLF-A/48V	63	40	100	25	25	6	7	4	10	10

Above diagram, the selection of C shows normal type auto breaker ,after C Digital said over rated current; cable selection in AWG American Standard refers to the diameter of the cable wire.

3.4.1 PV Input Connection

Step 1: Do the following inspections before PV side terminal connecting:

 (1) Please make sure system's DC air-switch is in off state, before connecting with PV array.

 (2) Please ensure PV array's polarity be matched with PV connectors' polarity, to avoid inverter & controller damage.

 (3) To ensure PV array's max open-circuit voltage must less than inverter & controller's max allowable input voltage.

Step 2: To make PV connectors and cable connecting of PV input side, please according to following steps:

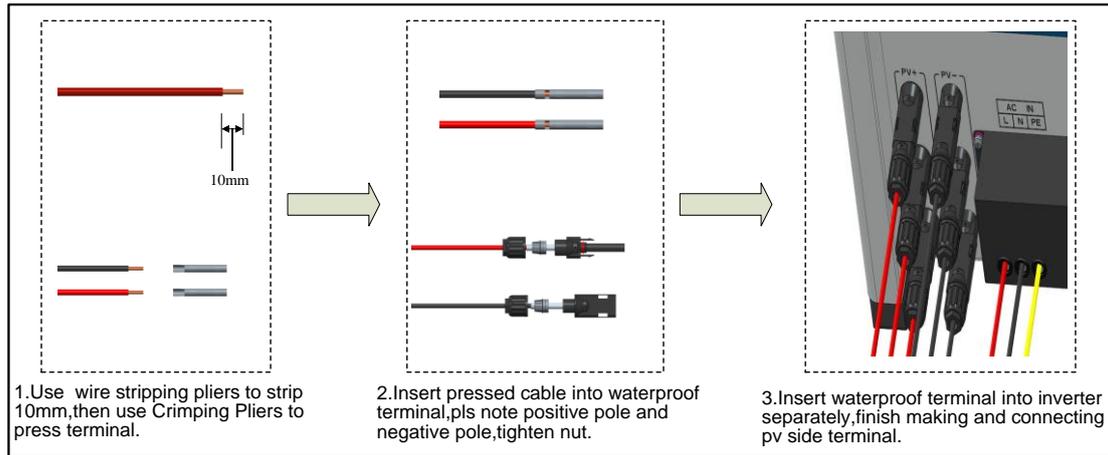


Figure 3-5 PV Array Terminal Making and Connecting Diagram

Step 3: During cable connecting of PV input side, insert PV cable of PV array into auto Air-switch respectively according to positive pole and negative pole; Then insert the two cables which made in Step 2 into Air-switch separately.

Step 4: Check whether PV connecting is correct and firm.

The cable connection diagram of PV input side is as follows:

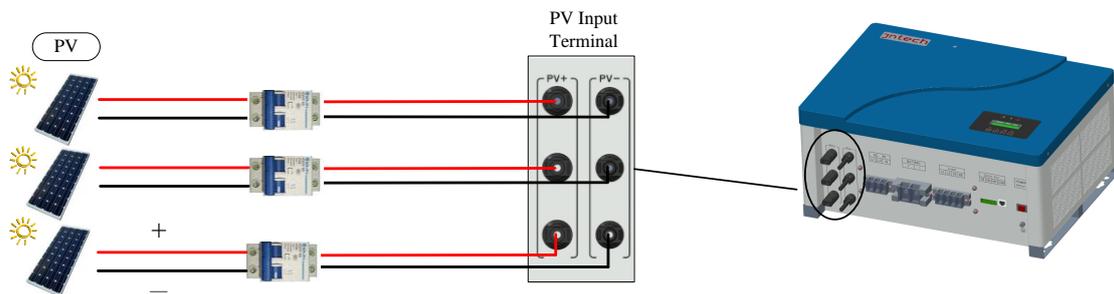


Figure 3-6 PV Input Side Cable Connecting Diagram

3.4.2 AC Input Connection

Inverter & Controller can accept two kinds of AC power input, one is single phase grid power, the other is single phase diesel generator power. Please select corresponding connection mode doing the specific connection.

3.4.2.1 Grid Power Input connection

 Please make sure Grid power in off state.

Step 1: Please according to follow methods, making Grid power side cable connection and connectors.

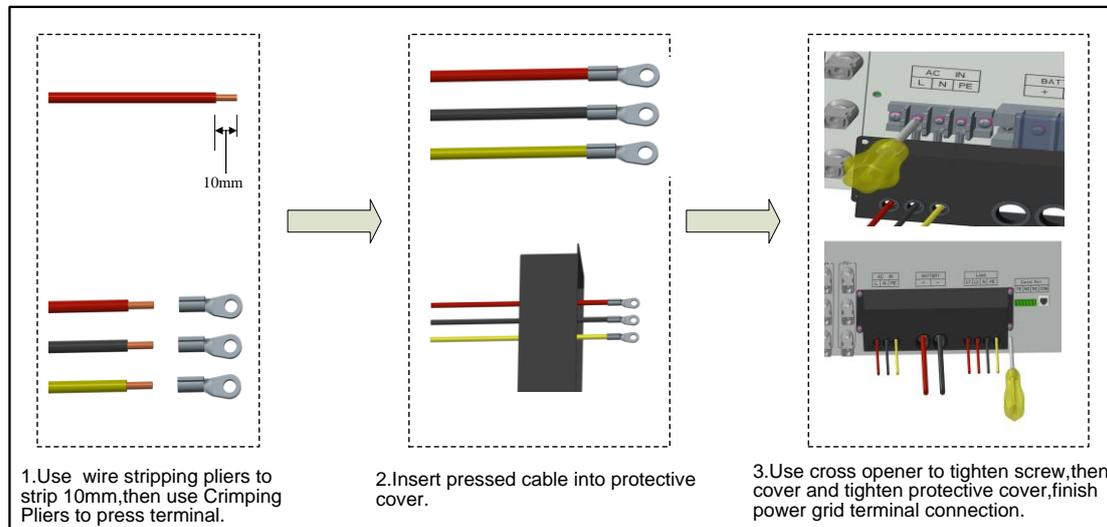


Figure 3-7 Grid Power Side Connectors Making and Cable Connecting Diagram

Step 2: When finished above inspections, keep AC side air-switch in off state, insert grid power side's cables into air-switch according to L1 (fire wire), L2(fire wire) and N (zero wire) separately.

Step 3: Then insert cables which were made in Step 2 into AC air-switch accordingly. Grid input side cable connecting diagram as follows:

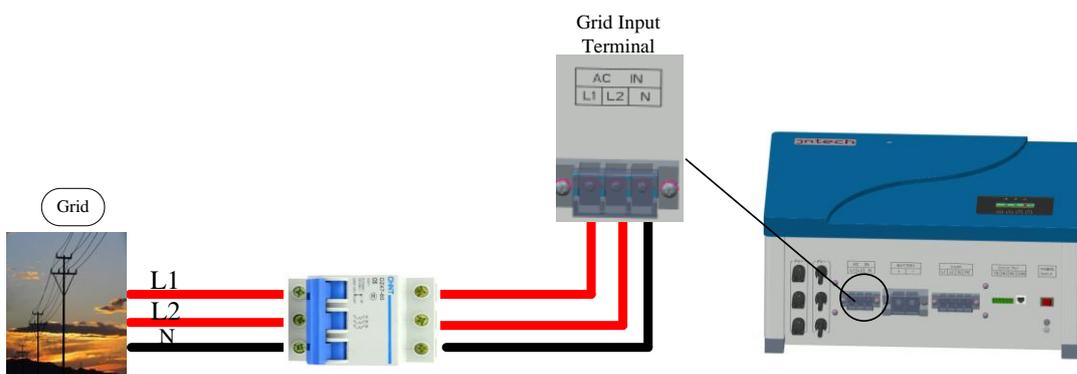


Figure 3-8 Grid Input Side Cable Connecting Diagram

3.4.2.2 Diesel Generator Connection



Please ensure inverter & controller in power off state.

Step 1: Refer to diesel generator's user manual, to find its start mode is NO (normally open) or NC (normally close) .

Step 2: If diesel generator's start mode is NO (normally open), then insert diesel generator's NO terminal into inverter & controller's NO terminal accordingly; If diesel generator's start mode is NC (normally close), then insert diesel generator's NC terminal into inverter & controller's NC terminal accordingly; Ensure the connecting of NO-NO or NC-NC is correct, specific connection mode, please refer to follows for details.

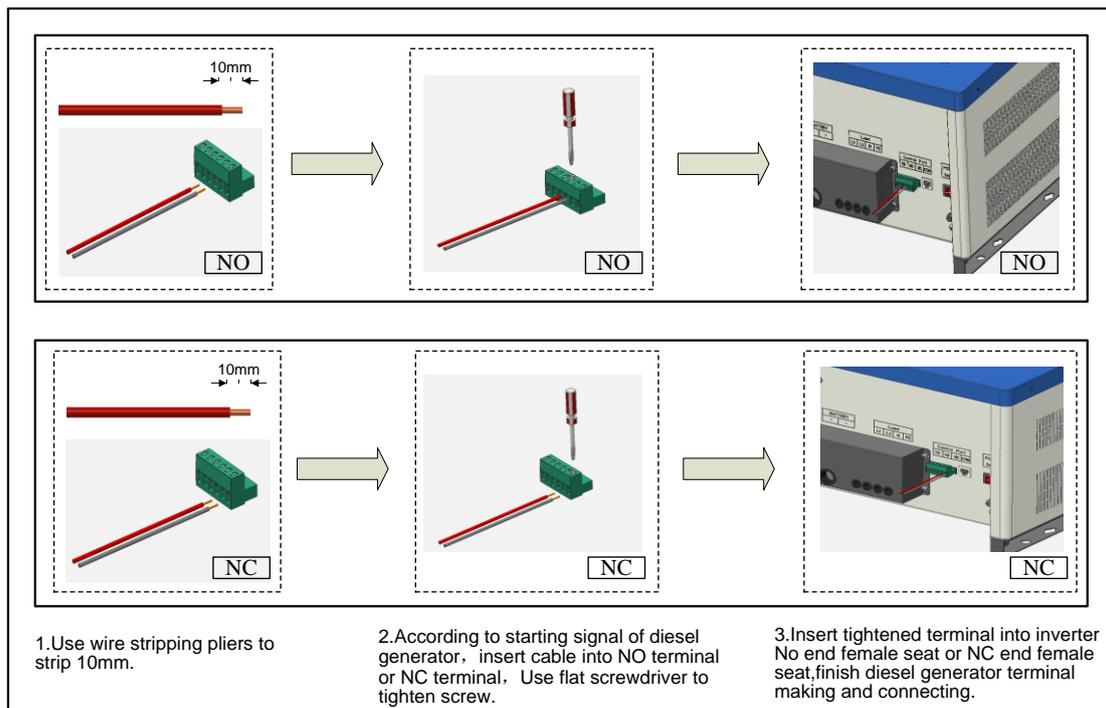


Figure 3-9 Diesel Generator Terminal Making and Cable Connecting Diagram

Step 3: Connecting diesel generator's AC output with inverter & controller's AC input, specific operation please refer to grid power input side cable connection. Diesel generator input side cable connection diagram as follows:

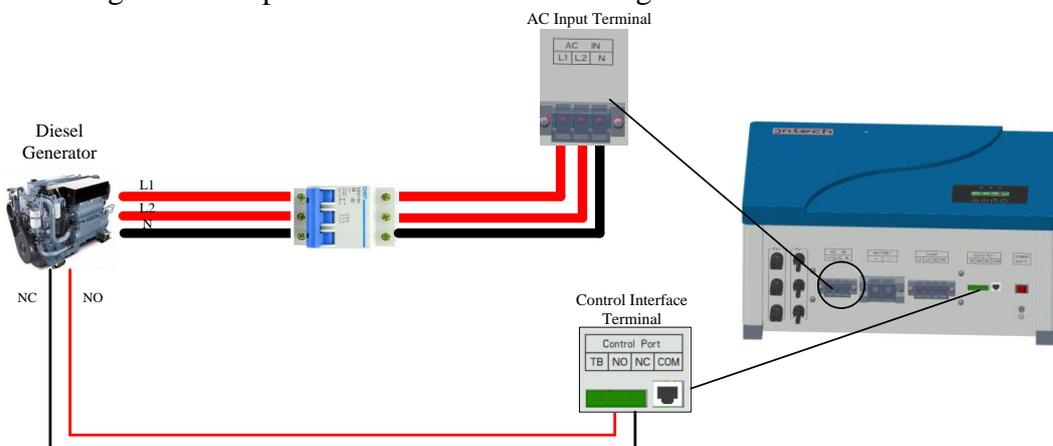


Figure 3-10 Diesel Generator Input Side Cable Connecting Diagram

3.4.3 Battery Connection

3.4.3.1 Battery Input Side connection

-  (1) Inverter & Controller in switch off state.
-  (2) Ensure battery side's air switch in off state.
-  (3) Avoid battery being short circuit during its installation.

Step 1: According to nameplate to confirm the battery pack voltage, JNTECH PV hybrid power generating system's battery pack voltage could refer to follow sheet.

Diagram 3-5 Battery Pack Voltage Selection List

Battery Pack Voltage	Inverter & Controller Model No.
24V	JNF1KLF-A/24V JNF1K5LF-A/24V JNF2KLF-A/24V
48V	JNF3KLF-A/48V JNF4KLF-A/48V JNF5KLF-A/48V

Step 2: Cable making and connecting, please refer to follow method:

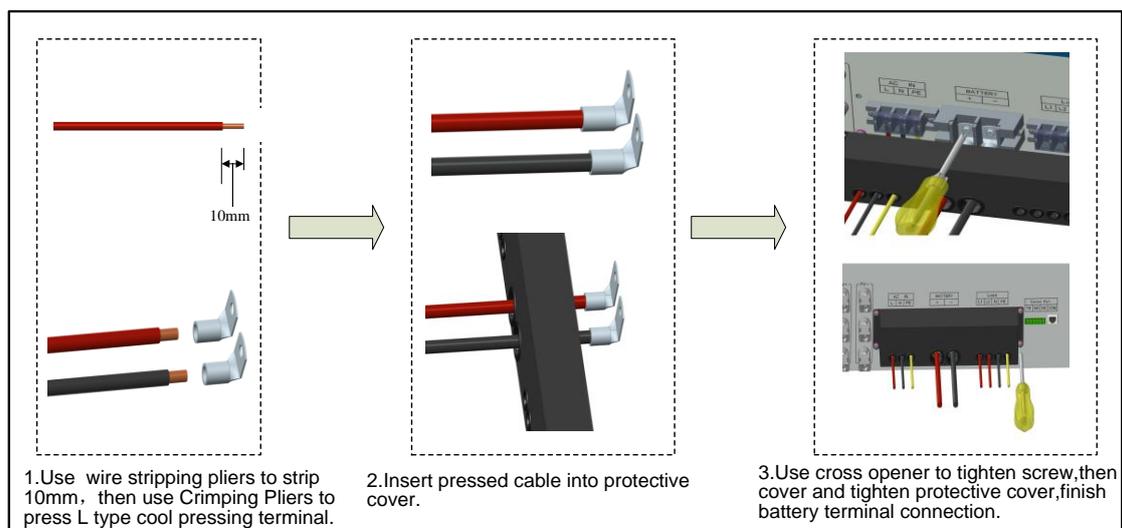


Figure 3-11 Battery Terminal Making and Connecting Diagram

Step 3: Keep battery side air switch in off state, first insert the cables of battery side into the above air- switch according to their positive and negative pole; Then put one end of cable which be made in step 2 into the above air-switch, the other end of cable into battery terminals (avoid battery's positive and negative pole connection, during cable connecting operation); Battery input side cable connecting diagram as follows:

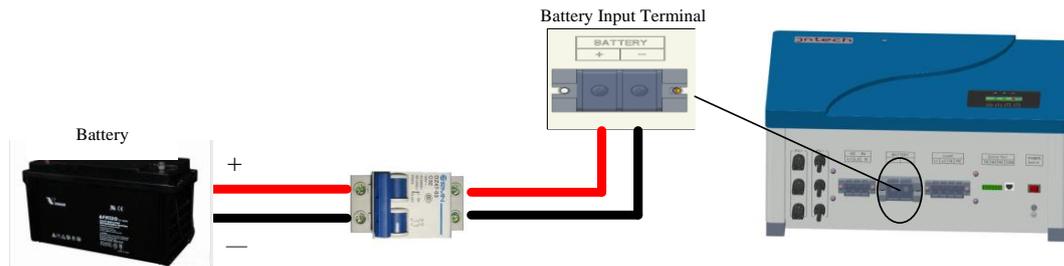


Figure 3-12 Battery Input Side Cable Connecting Diagram

3.4.3.2 Battery TB Side Connection

 Inverter & controller is in power off, switch off state.

Step 1: Measure line distance between TB side to battery pack, choose suitable length cable.

Step 2: Make TB side terminals according to following method,

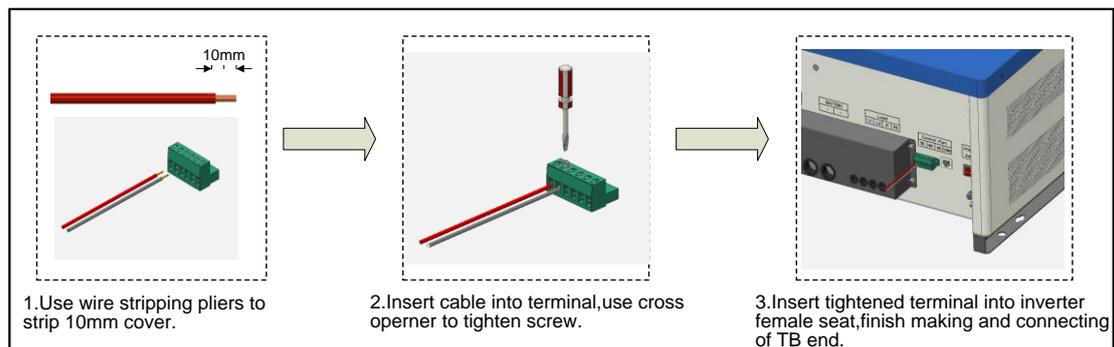


Figure 3-13 TB side terminals making and cable connecting diagram

Step 3: Insert one end of temperature sensitive line into control interface terminal, the other end of inductor be fixed on the batteries with glue. Control interface TB side's cable connecting method is as follows:

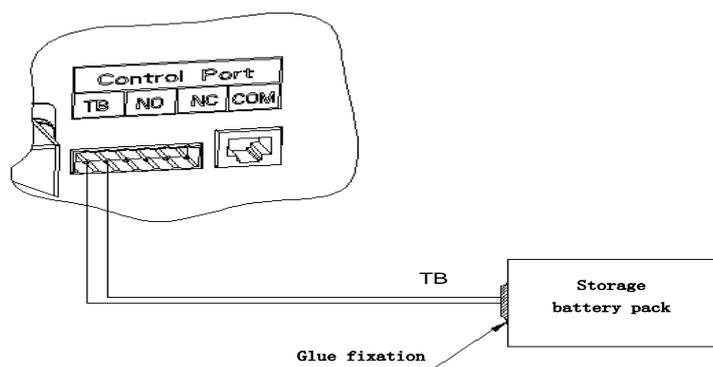


Figure 3-14 TB Side Cable Connecting Diagram

3.4.4 AC Output Connection

 Inverter & controller is in power off, switch off state.

Step 1: Making AC output side terminals according to following method:

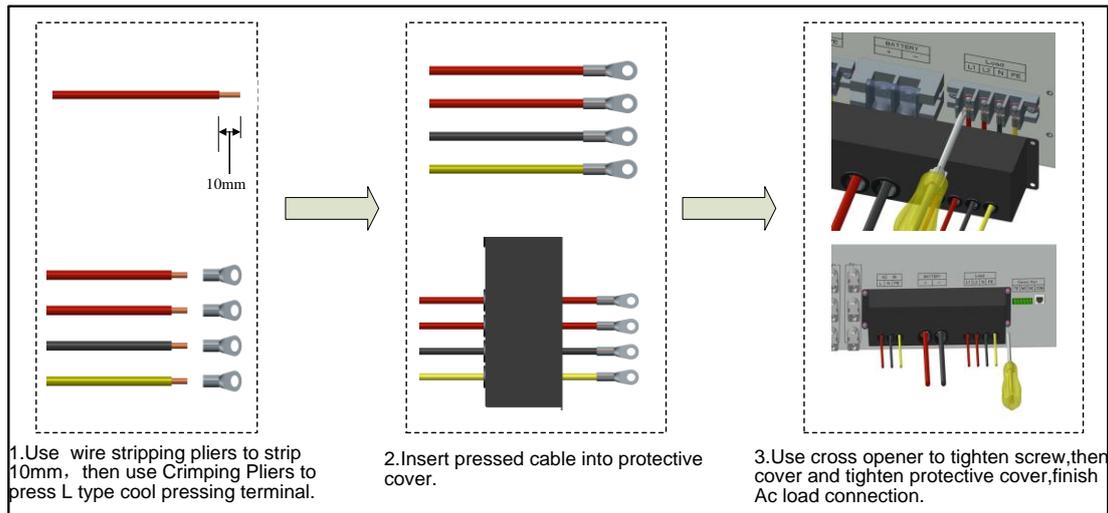


Figure 3-15 AC loads terminals' Making and Cable Connecting Diagram

Step 2: AC Output side have two Lines: L1 (Emergency load fire wire) and L2 (Heavy load fire wire). Each line have one air-switch, ensure these two air-switches in switch off state, then insert the above AC output cables into their corresponding air-switch.

Step 3: Then insert one end of the cables which made in Step 1 into related air- switch, the other end of cable into inverter & controller's AC output terminals : L1 terminal or L2 terminal.

AC output side's cable connecting diagram as follows

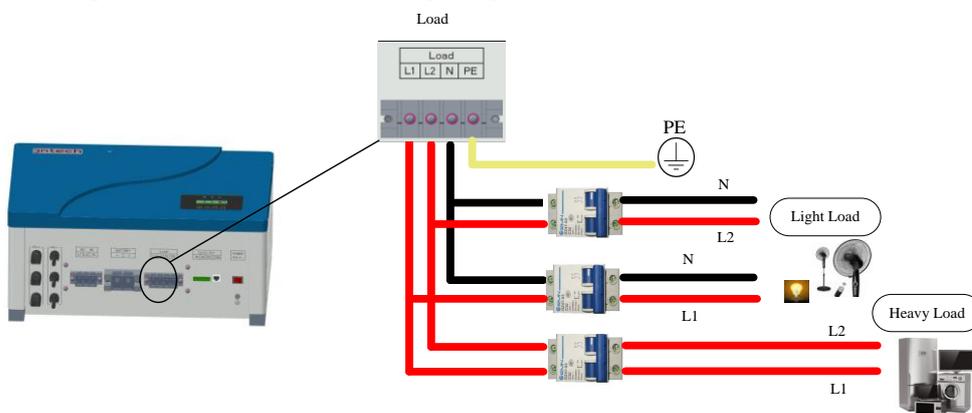


Figure 3-16 AC Output Side Cable Connecting Diagram



Illustration!

Over load is forbid for PV hybrid inverter & controller.

3.4.5 Communication Connection

Step 1: Before communication interface connecting, please check follows items:

- (1) Ensure PV hybrid inverter & controller is in power off, switch off state ;
- (2) Please clear the communication interface, ensure there is no foreign matters.

Step 2: Making communication interface terminals according to following methods:

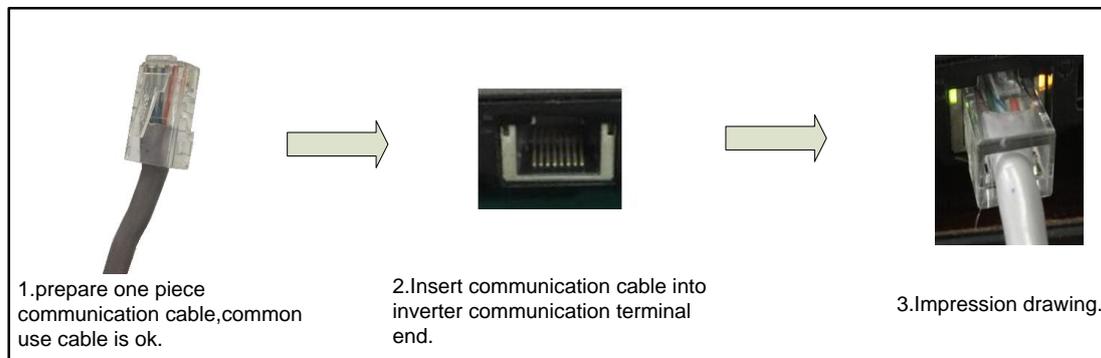


Figure 3-17 Communication Interface Terminal Making and Cable Connection Diagram

Step 3: Connecting the needed communication appliances (such as computer, communication module,ect) with inverter & controller through COM interface.

Follows are control interface connection figure:

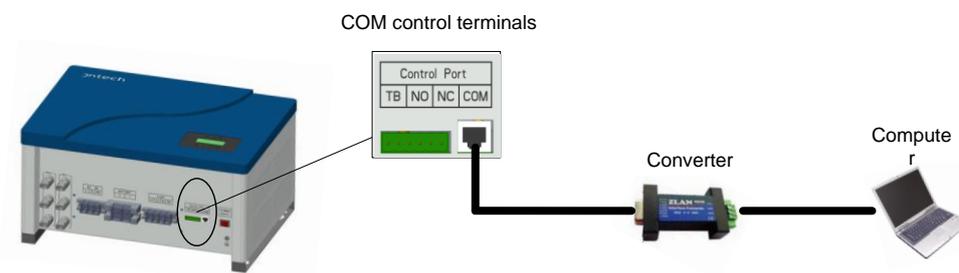


Figure 3-18 Control Interface Connecting General Diagram

4.Commissioning

4.1 Electrical Connection Inspection before Commissioning

Before commissioning, electrical connection inspection should be done strictly, to ensure safety of the inverter & controller as well as the personal safety; To prevent accidents, specific inspection items as follows:

- (1) Check whether the PV open circuit voltage is within the allowable voltage range of the inverter & controller;
- (2) Check if the PV positive and negative poles are correct;
- (3) Checking AC input connection is firm or not;
- (4) Checking whether the battery voltage is within the allowable range of the inverter & controller;
- (5) Checking the negative and positive pole of battery be right;
- (6) Checking AC output side is firm and correct ;
- (7) Checking control interface is firm and correct.

4.2 Charging Commissioning

4.2.1 PV Charging Commissioning

Please ensure that commissioning is doing in sunny condition, specific operation steps as follows:

Step 1: Turn on air-switch of battery pack;

Step 2: Turn on air-switch of PV input side, waiting about one minute, check the LCD indicator light lighten or not, then check the LCD display status, shown as follows:

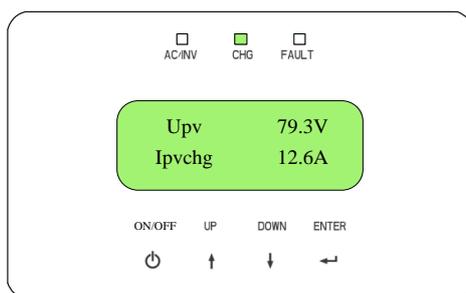


Figure 4-1 PV Charging LCD Diagram

Step 3: LCD display PV charging status is normal, turn off the PV input side air-switch, finish PV charging commissioning.

4.2.2 Grid Power Charging Commissioning

To ensure grid voltage is normal, firm connecting, specific operation steps as follows:

Step 1: Open power switch, then turn on air-switches of grid input side and battery side;

Step 2: Enter into the dispatching mode, change from Charging dispatching mode to power grid mode (specific operation refer to chart 4-16), waiting one minute, then check grid power charging state, LCD display “Charging” indicator light is in green, as follows:

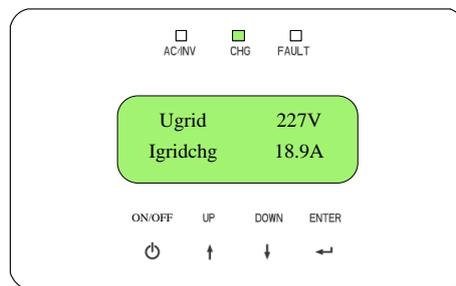


Figure 4-2 Grid Power Charging LCD Diagram

Step 3: LCD display shows charging state is normal, turn off grid side air-switch, finish grid charging commissioning.

4.3 Inverter & Controller Output Commissioning

4.3.1 Battery Power’s Inverting Output

Ensure battery pack’s air-switch in off state, battery pack’ voltage is normal, specific operation step as follows:

Step 1: Long press ON/OFF button more than 2 seconds, inverter start working; check whether LCD display AC voltage is within $220V \pm 15$ or not, and board indicator light “AC/INV” is keep in green, specific as follows:

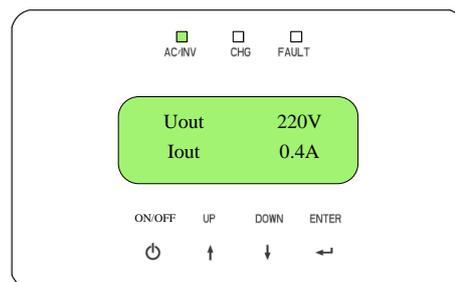


Figure 4-3 Normal Inverting Working of LCD Display Diagram

Step 2: LCD display inverter output is normal, press ON/OFF key, switch off inverting output, finish battery power's inverter output commissioning.

4.3.2 Grid Pass-by Output

Ensure grid voltage is normal, Grid supply power directly. No more other input interfaces, specific operation step as follows:

Step 1: Turn off grid side air-switch, then check if grid voltage is normal.

Step 2: Enter into the dispatching mode, set up current mode to Grid by-pass mode (specific operation, please refer to Chart 4-16), long press ON/OFF button more than 2 seconds, observe whether inverter & controller's output is normal or not. AC voltmeter shows voltage is within $220V \pm 15\%$, LCD display "AC/INV" indicator light is in green and flashing, specifics as follows:

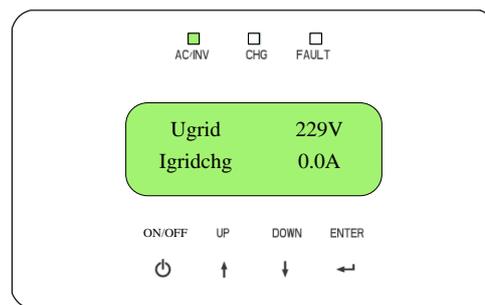


Figure 4-4 Grid Pass-by LCD Display Diagram

Step 3: Press ON/OFF switch off Grid by-pass output, finish grid power pass-by output commissioning.

4.3.3 Diesel Generator Pass-by Output

Please ensure that the starting signal of diesel generator is connected with the communication interface of inverter & controller, and the input terminals of the diesel generator is connected to the input side of Grid power without passing through other inputs, specific operation procedures are as follows:

Step 1: Turn on the air-switch of diesel generator input;

Step 2: Setting the dispatching mode. select input source to be diesel generator (specific operation refer to Chart 4-16), wait one minute after starting inverter &

controller to see if diesel generator can start. Long press ON/OFF button for more than 2S to check whether pass-by output is normal. AC voltmeter shows voltage be 220V ±15%, LCD indicator light is in green and flashing, specifics as follows:

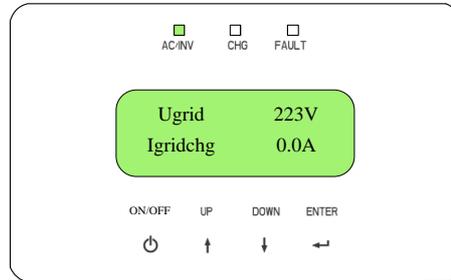


Figure 4-5 Diesel Generator Pass-by LCD Display Diagram

Step 3: Press ON/OFF button to switch off diesel generator pass-by output, finish diesel generator pass-by output commissioning.

4.4 Union Commissioning

Please ensure that all of the electrical connection of inverter & controller is completed, and the commissioning condition of the whole machine is fulfilled. Union commissioning specific operation procedures are as follows:

Step 1: Turn on the air-switches of PV input side, Grid input side, and diesel generator input.

Step 2: Restore the dispatching mode, all dispatching mode be set to automatic mode (specific operations refer to figure 4-16);

Switch in AC loads (load power should be within Inverter & Controller's rated output power), Turn on the power switch. Long press ON/OFF button for over 2S to watch LCD display status, specifics as follows:

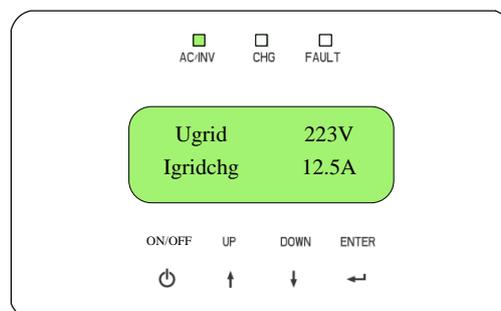


Figure 4-6 Union Commissioning Diagram

Step 3: LCD display status is normal, turn off all air-switches and power switch, finish union commissioning.

4.5 LCD Panel Operating Instructions

4.5.1 LCD display

Inverter & controller have LCD display and LED display function, we can check system working information and set up key parameters. Meanwhile, LED light indicating inverter & controller’s current working status. Display board as follows:

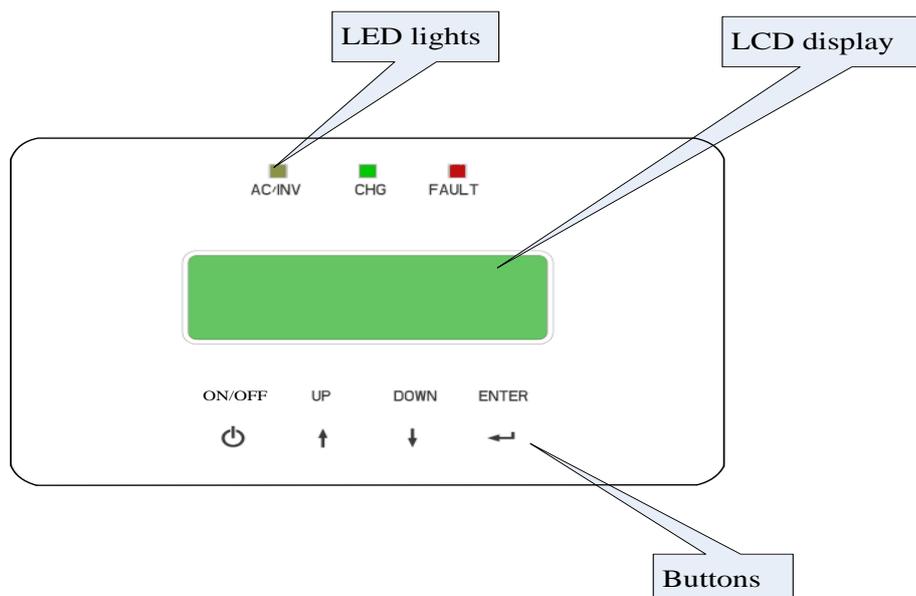


Figure 4-7 Display Board Diagram

Diagram 4-1 LED Light Meaning

Indicator lamp	Color	Illustration
AC/INV	Green	When inverter & controller connects with loads, invert DC to AC, the light is in green; When switch on Pass-by, the light is in green and flashing.
	Green & flash	
CHG	Green	When PV panel or Grid power charges battery, light is in green.
FAULT	Red	If over load, light is in red

Diagram 4-2 Press Button Instructions

Keyboard	Illustration
ON/OFF	Long press over 2s to turn on machine, short press to turn off machine.
UP	Upward selection
DOWN	Downward selection
ENTER	Press once enter next menu, press “DOWN+ENTER” button anywhere at the same time, return to display interface.

4.5.2 LCD Display Interface

Follows are LCD display general block diagram, easy to know distribution of LCD operation.

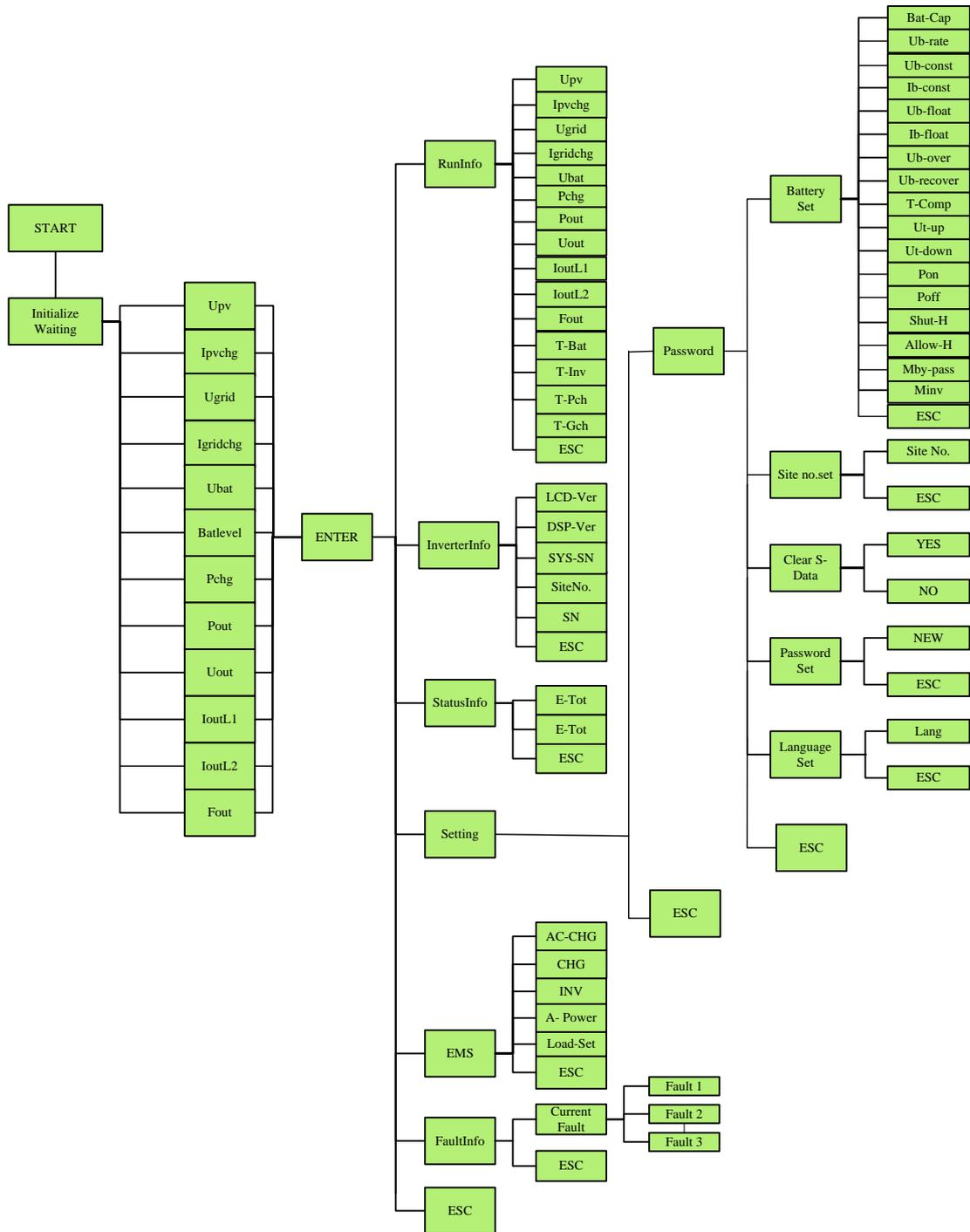


Figure 4-8 LCD Display Block Diagram

4.5.3 LCD Display Content

Turn on LCD, “Initialize Waiting...” appears, 3S later display interface shows as follow:

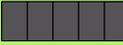
Upv	0.0V
Ipvchg	0.0A
Ugrid	0V
Igridchg	0.0A
Ubat	0.0V
Batlevel	
Pchg	0W
Pout	0W
Uout	0V
IoutL1	0.0A
IoutL2	0.0A
Fout	0.0Hz

Figure 4-9 LCD Display Interface Show

LCD display interface’s content and function explanatio, please reference to appendix A Diagram 6-1.

Turn on LCD display interface, then press, enter into home page (main) menu, specifics as follows:

RunInfo
InverterInfo
StatsInfo
Settings
EMS
FaultInfo
ESC

Figure 4-10 Main Menu Interface Display

Main Menu function description, pls refer to appendix A Diagram 6-2

4.5.4 LCD Display Function Information and Basic Operation

4.5.4.1 LCD's Working Information and Its Basic Operation

Followings are LCD's working information block diagram, could help you easy to know its operation process:

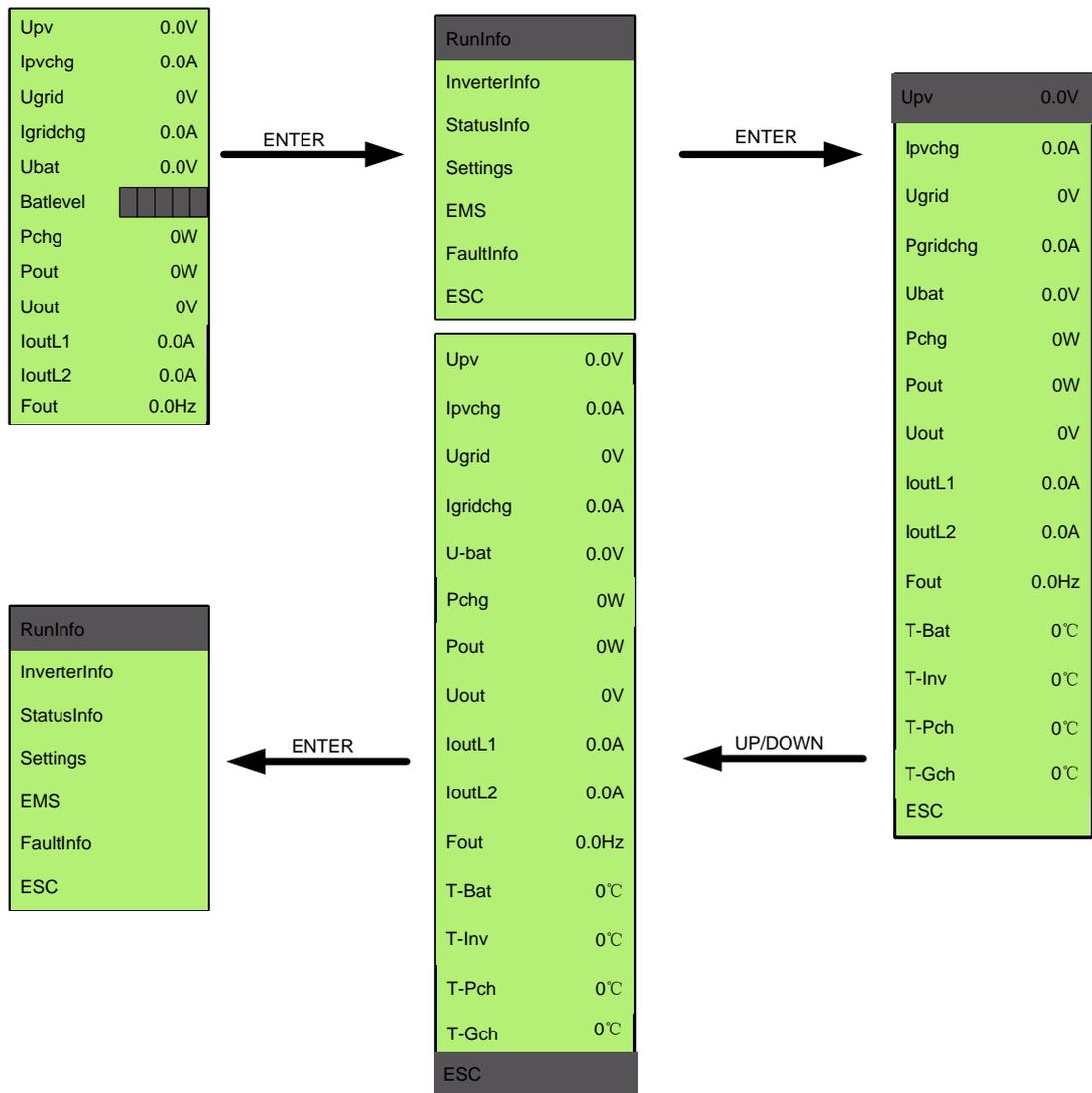


Figure 4-11 Working Information Operation Interface

Working information function illustration, please refer to appendix A Diagram 6-2.

4.5.4.2 LCD Basic information and Its Basic Operation

Follows are LCD basic information operation block diagram, could help you easy to know the basic information operation process:

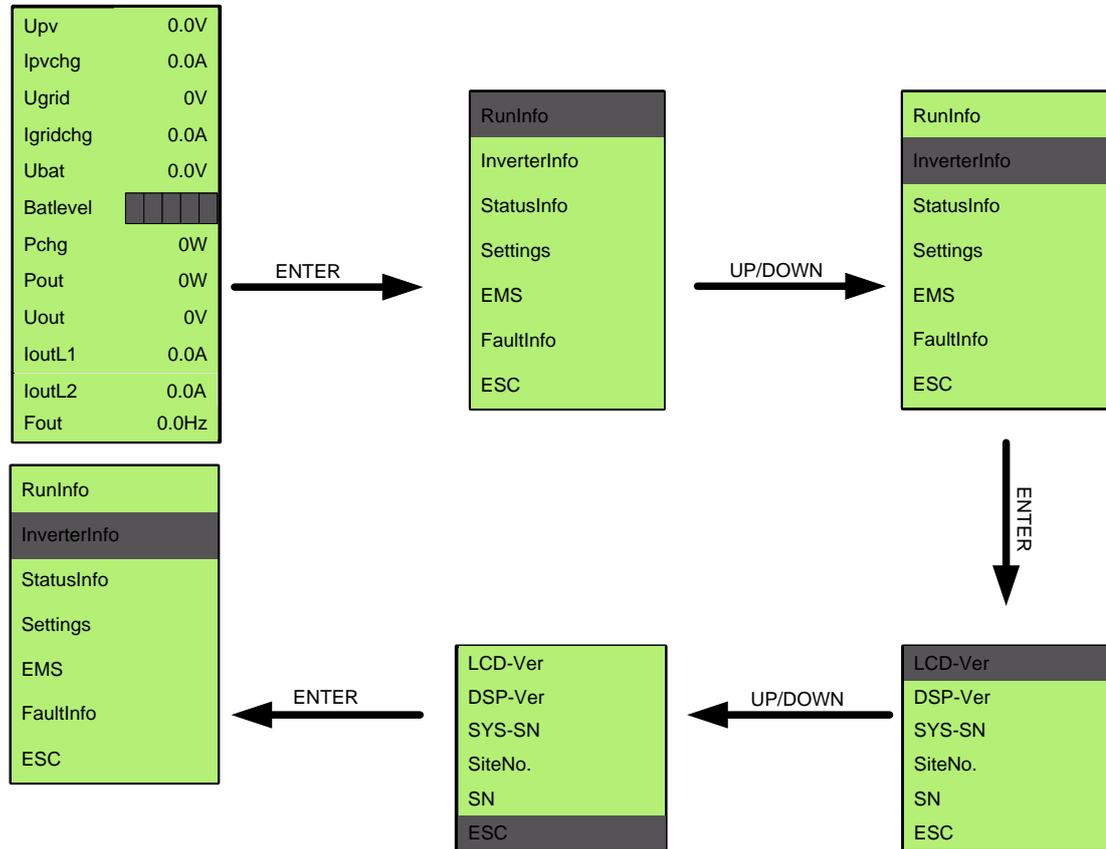


Figure 4-12 LCD Basic Information Operation Interface

For basic information function illustration, please refer to appendix a Diagram 6-2

4.5.4.3 LCD's Statistical Information and Basic Operation

Follows are LCD's statistical information block diagram, could help you easy to know its operation process:

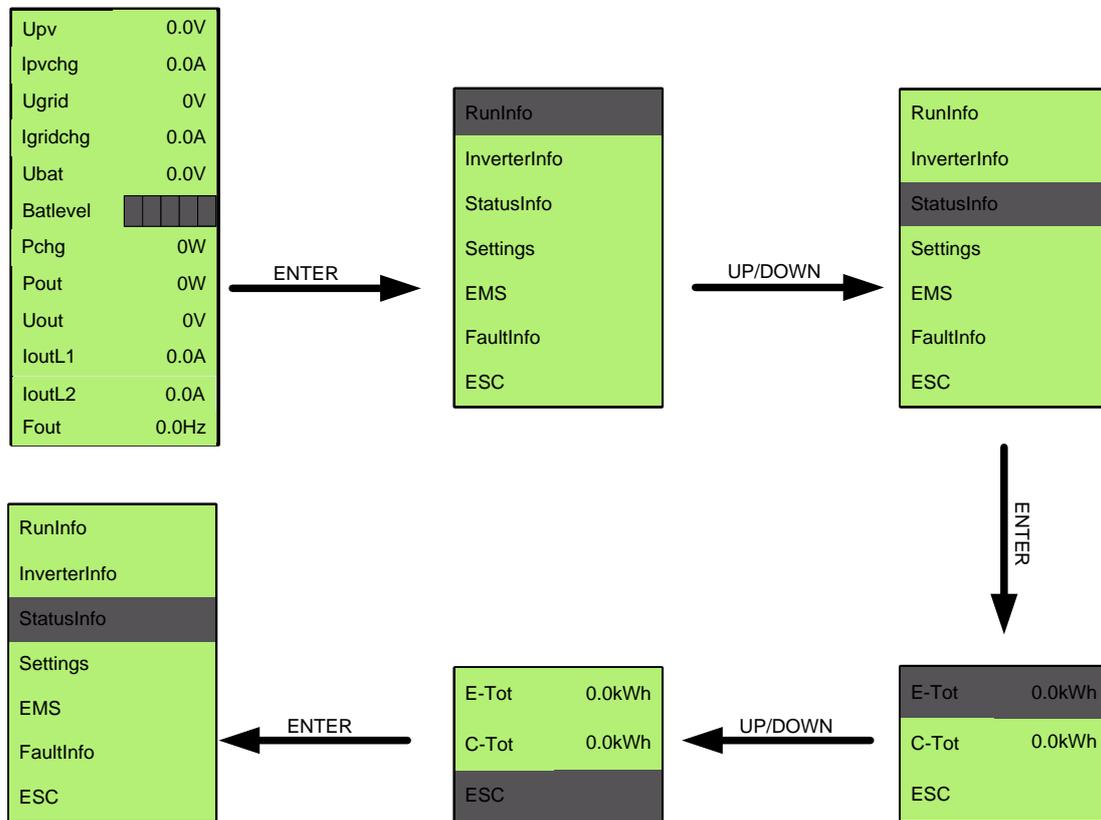


Figure 4-13 LCD's Statistical Information Operation Interface

For statistical information function illustration, please refer to appendix a Diagram 6-2.

4.5.4.4 LCD Parameter Setting and Basic Operation

Follows are LCD Parameter Setting operation block diagram, could help you easy to know its operation process:

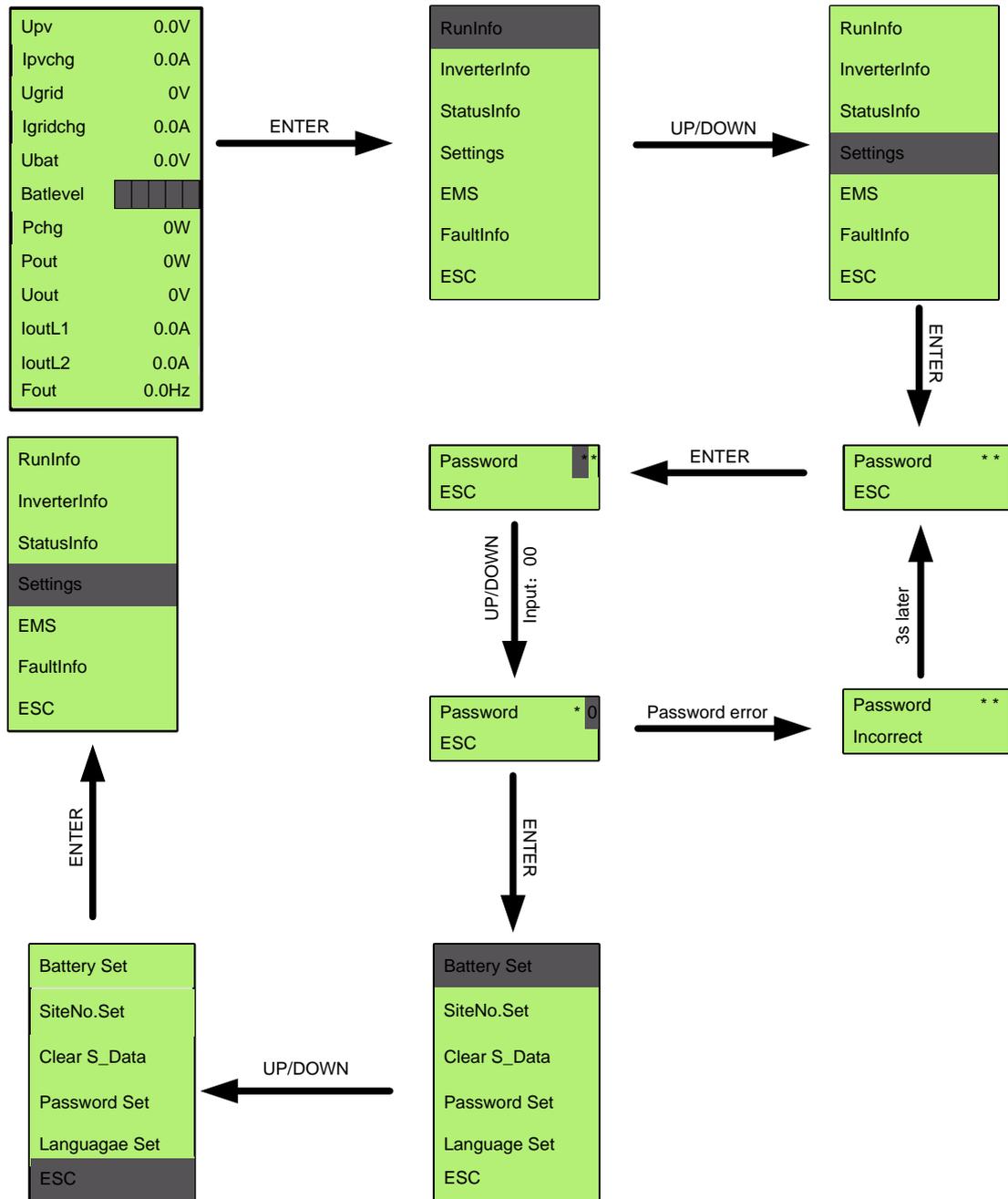


Figure 4-14 Parameter Setting Operation Interface

For Parameter Setting function illustration, please refer to appendix A Diagram 6-2.

4.5.4.5 LCD Malfunction Information and Basic Operation

Followings are LCD malfunction information operation block diagram, could help you easy to know its operation process:

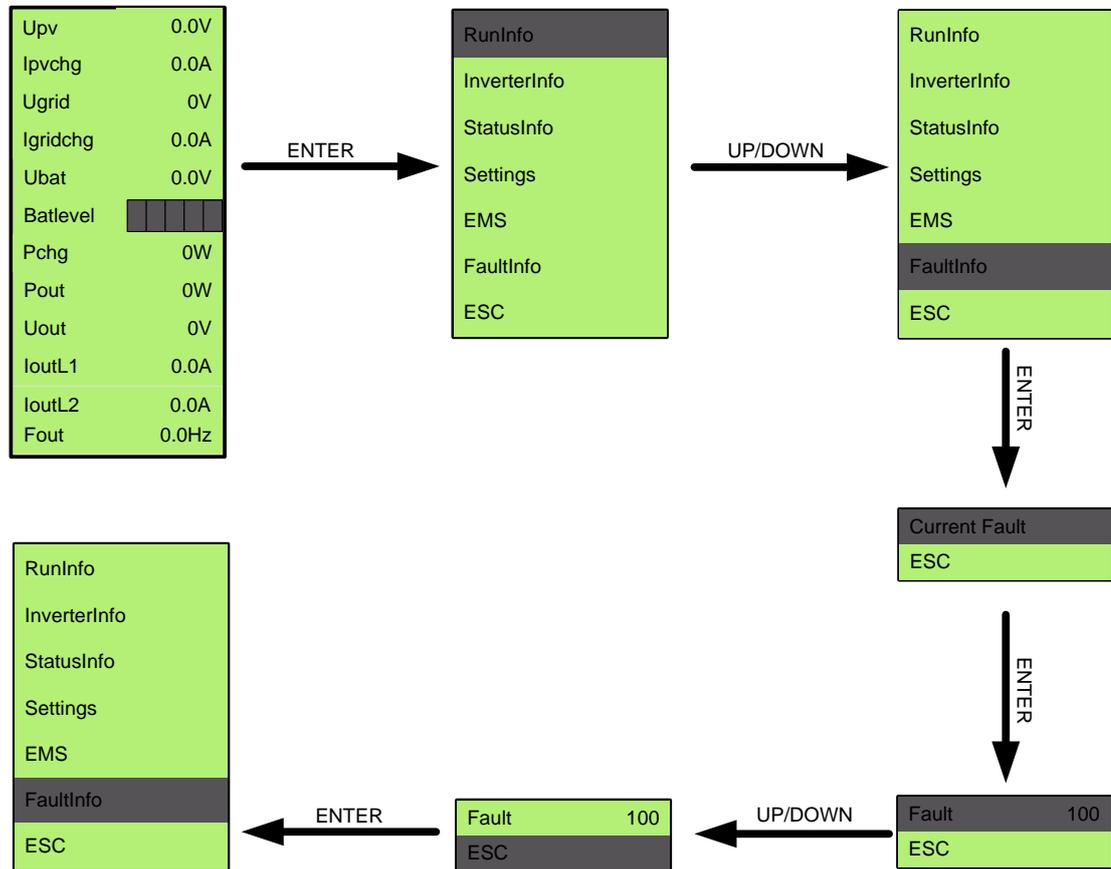


Figure 4-15 Malfunction Information Operation Interface

For malfunction information function illustration, please refer to appendix A Diagram 6-2.

4.5.4.6 LCD Dispatching Settings and Its Basic Operation

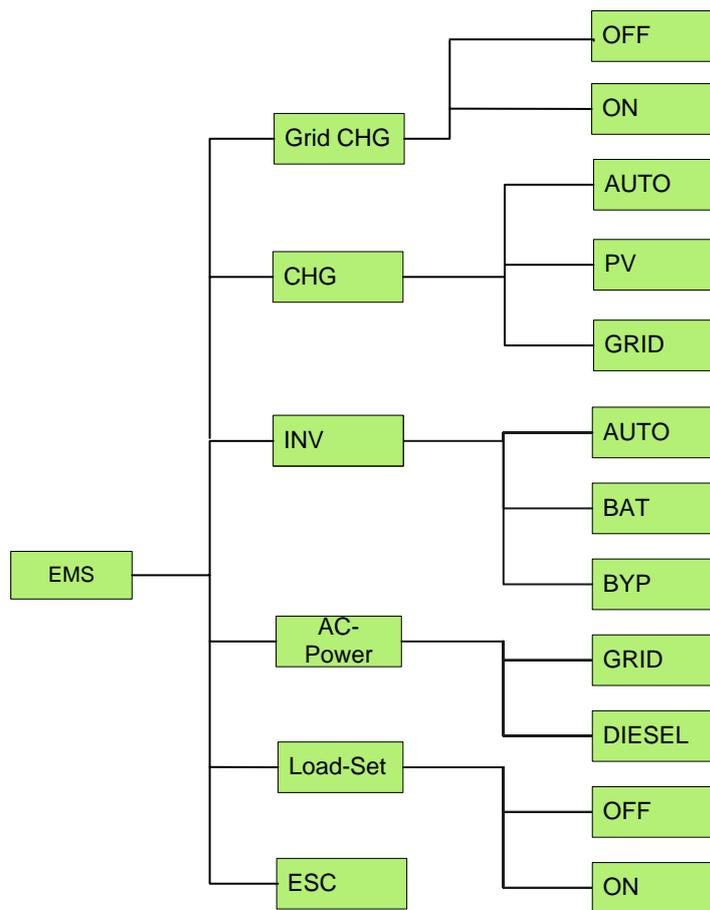


Figure 4-16 Dispatching Settings Classification Diagram

Chart 4-3 Dispatching Settings Classification Illustration

Dispatching Settings	Function Illustration
Grid Charging	ON: Enable Grid Charging
	OFF: Power Off Grid Charging
Charging Dispatch	AUTO: Intelligent dispatch
	PV: PV charging mode
	GRID: AC charging mode
Inverting Dispatch	AUTO: Intelligent dispatch
	BAT: Battery mode
	BYP: AC Pass-by mode
Selecting Input	GRID: Grid power input
	DIESEL: Diesel generator input
Heavy load switch	Factory default is on

Following is the LCD dispatching setting operation block diagram. It can be simple and clear understanding of dispatching setting operation process:

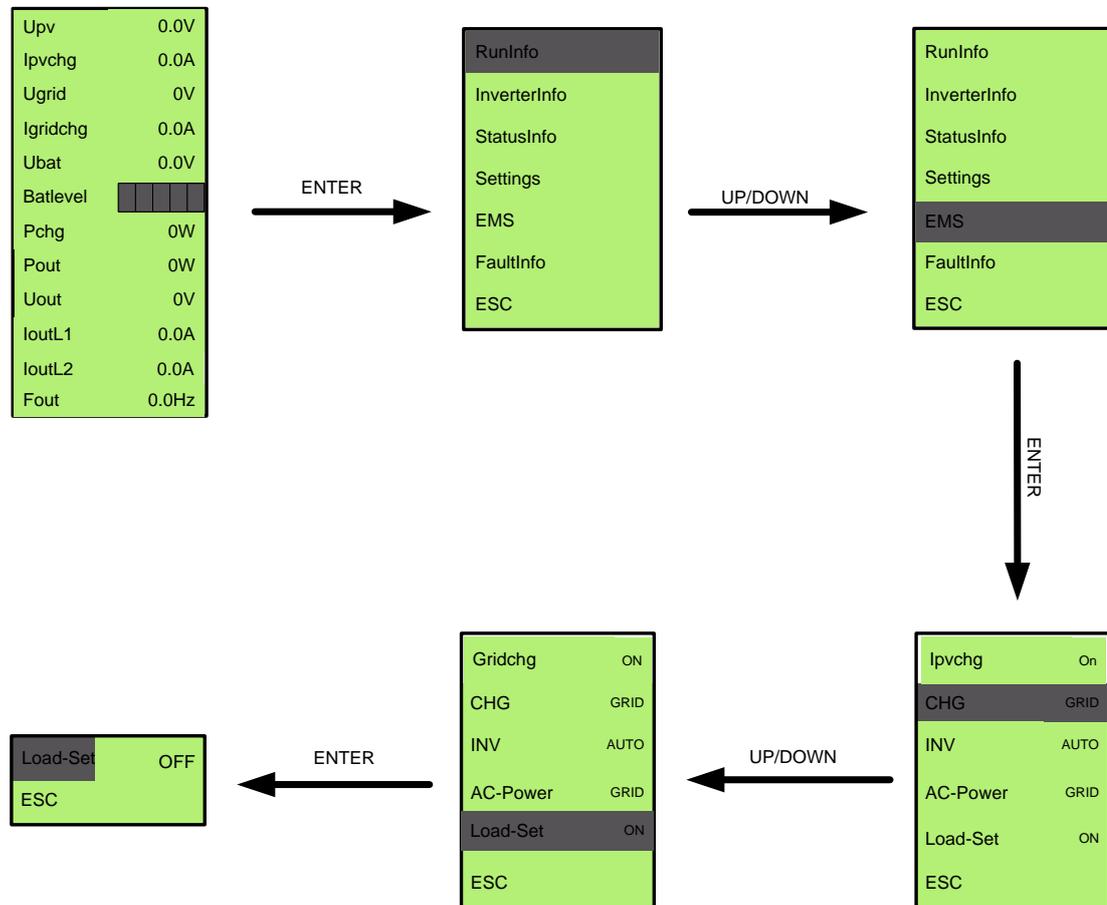


Figure 4-17 Dispatching Settings (heavy loads setting) Operation Interface

For dispatching settings function illustration, please refer to appendix a Diagram 6-2.

When batteries pack be changed to different model, in order to increase work efficiency, some battery parameters need to be modified, parameter setting's default password is "00".



Explanation!

1. Based on the matched battery pack, the most suitable parameter setting has been finished, before the cargo delivery, so no need any modification, can be used directly.
2. In secondary menu, only the parameters of parameter settings menu's sub menu could be modified, others no.

5.Common Troubleshooting and Maintenance

5.1 Troubleshooting

Once fault occurs, the fault light will be lightened up. Fault code will be shown on LCD screen. User can inquire fault information according to fault code. The troubleshooting solution listed on following table. User can check and find out the cause of fault and solution to solve the problem. Please refer to the following table 5-1 for details.

Table 5-1 Shutdown status and processing table

Status code	Status name	Machine phenomenon	Possible reason	Processing method
Fault 100、101	Over charging	Fault light is on and whole machine stops working	Inside fault	Please contact Jntech customer service
Fault 102、303、305	Charing overheating	Fault light is on and whole machine stops working	Cooling function efficiency reduced or failed.	Check whether the fan is working normally. If ventilation holes of housing are blocked by foreign matter.
Fault 103、104、210、302、304	Temperature sampling failure	Fault light is on and fan starting to work normally.	temperature sensor wiring loose or dust interference sampling.	No need to handle, machine can operate normally.
Fault 105、106、107、202、203	Fault of battery voltage	Fault light is on, when Fault 106, fault 203 occurs, Fault light is not on, the whole machine stops working	Inside fault.	Check whether battery damaged or not, battery voltage is normal or not.
Fault 108	PV Array over voltage	Fault light is on and machine stops working	PV input voltage is too high.	Break off PV input, check whether input voltage is over 130Vdc or not, reduce PV panels in series.



Fault 204、 205	Inverter overcurrent	Fault light is on and the whole machine stops working	Load starting current is too Large.	Check whether the load power is too large, reduce the number of loads or replace the use of low-power loads.
Fault 206	Inverter overvoltage	Fault light is on and whole machine stops working	Loads power changed too much.	After connection of loads, re-start machine.
Fault 207、 209	Output overheating	Fault light is on and the whole machine stops working	Overheating inside machine.	Check if the fan of the whole unit is in normal operation and whether the ventilation holes are blocked by foreign matter.
Fault 200、 201	abnormal inversion of voltage and current	Fault light is on and the whole machine stops working	inside fault.	Please contact Jntech customer service
Fault 211	Abnormal overload relay	Fault light is on and the heavy duty relay is closed	inside fault.	Please contact Jntech customer service. please get power from emergency terminal for short-term.
Fault 300	AC under voltage	Fault light is not on, grid charging and bypass inverter does not work	Grid disconnected or grid voltage is abnormal.	Please check whether grid power is normal or not.
Fault 301	AC overvoltage	Fault light is on and the whole machine stops working	Grid power input voltage is too large.	Break off grid power, check whether the grid voltage exceeds 260V or not.

5.2 Maintenance



Before maintenance, please ensure the machine is not charged, Make a routine inspection for inverter with charger as following every half year.

- Check whether there is damage or deformation
- Check whether there is abnormal noise in the inverter with charger.
- Check whether the parameter settings are normal and the time setting is accurate
- Check whether the fan is running properly. Whether it was blocked by foreign matter.

Make inspection as following for inverter with charger every six months:

- Check the humidity and dust of the surrounding environment of machine, such as excessive dust, please clean the machine.
- Check whether the cable connection of the machine is loose. If it is loose, fasten it again according to the wire connection method introduced previous.
- Check whether the cable is damaged, especially, if there is any signs of cuts on the skin that comes into contact with the metal surface.

6. Appendix A

LCD menu and parameters setting as follows:



Table 6-1 LCD priority screen display content

Display content	Function declaration
PV panel Voltage	Display PV array present voltage.
PV panel charging	Display PV array present charging current.
Grid Power voltage	Display the present grid AC voltage.
Grid Power charging	Display grid AC charging current.
Battery voltage	Display battery present voltage.
Battery capacity	Display remaining battery capacity.
Charging power	Display PV array present charging power.
Load power	Displays the load power during operation
AC voltage	Displays the output voltage during operation
AC current L1	Display output AC 115V current during operation
AC current L2	Display output AC 230V current during operation
AC frequency	Display output frequency during operation

Table 6-2 LCD menu content

Main menu	Function declaration
Operation information	Display machine present working status.
Basic information	Display machine software version.
Statistics information	Display machine total generated power.
System setting	Machine key parameter settings.
Fault message	Display machine present fault code.
Esc	Exit the menu, return to the first screen.
Secondary menu (Operation information)	Function declaration
PV voltage	Display PV array present voltage.
PV charging	Display PV array present charging current.
Grid Power voltage	Display grid present voltage.
Grid charging	Display present grid charging current.
Battery voltage	Display present battery voltage.
Charging power	Display PV array present charging power.
Load power	Display load power during operation.
AC voltage	Display AC output voltage during operation.
AC current	Display AC output current during operation.
AC frequency	Display AC output frequency during operation.
Battery temperature	Display present battery temperature.
Inverter temperature	Display inverter present temperature.
PV temperature	Display PV charger present temperature.
Grid temperature	Display grid charger present temperature.

ESC	Return to previous layer menu.
Secondary menu (Basic information)	Function declaration
LCD-version	Display present LCD screen version number
DSP-version	Display present DSP version number
SYS-SN	Display present machine model number.
SiteNo.	Display present machine site number.
SN numver	Display present machine series number.
ESC	Return to previous layer menu.
Secondary menu (statistics information)	Function declaration
Total generated power	Display total Power generation.
Total consumed power	Display present total system power consumption.
ESC	Return to previous layer menu.
Secondary menu (system settings, password 00)	Function declaration
Battery settings	Set battery related parameter.
Dispatch settings	Set the system energy scheduling related parameters.
Zero power information	Power generation and power consumption will be cleared.
Password settings	Set entering password.
Language settings	Set display language in English or Chinese.
Factory reset	Restore parameters to factory setting
ESC	Return to previous password input menu.
Secondary menu (dispatching setting)	Function declaration
Grid charging	Set the grid charging mode of system.
Charging dispatching	Set the charging mode of system.
Inverting dispatching	Set the system output mode.
Select input	AC bypass input source selection for machine.
Heavy load switch	Heavy load switch selection of machine.
ESC	Return to previous layer menu interface.
Secondary menu (Malfunction information)	Function declaration
Present fault	Display system Present fault.
ESC	Return to previous layer menu.
Third-level menu (battery settings)	Function declaration
Battery capacity	Set system battery capacity.
Rated voltage	Set the system rated battery voltage.
Constant charging voltage	Charging voltage during the machine in constant charging status.

Constant charging current	Charging current during the machine in constant charging status.
Floating charge voltage	Charging voltage during the machine in floating charging status.
Floating charge current	Charging current during the machine in floating charging status. status.
Overvoltage disconnection	When the battery voltage exceeds the set value, break off the charging function.
Overvoltage recovery	The machine break off during overvoltage, when voltage reduces to set value, it recovers charging function
temperature compensation	Set temperature compensation coefficient during battery charging.
upper limit of temperature compensation	Set upper limit of temperature compensation coefficient during battery charging.
lower limit of temperature compensation	Set lower limit of temperature compensation coefficient during battery charging.
Minimum quantity of electricity	Minimum charging quantity of electricity when system start diesel generator
Maximum quantity of electricity	Maximum charging quantity of electricity when system close diesel generator
Minimal quantity electricity for heavy load	Set the minimum quantity of electricity which is not allowed for discharging by heavy load.
Permission quantity electricity for heavy load	Set the maximum quantity of electricity which permits for discharging by heavy load.
ESC	Return to previous layer menu interface.
Third-Level Menu (Zero clearing power generation information)	Function declaration
Yes	Zero clearing power generation information
No	Cancel
Third-Level Menu (Password Setting)	Function declaration
New Password	Set new password
Cancel	Return to previous menu
Third-Level Menu (Language Setting)	Function declaration
Language	Chinese / English
Cancel	Return to previous menu
Third-Level Menu (Restore Factory Defaults)	Function declaration
Yes	Restore Factory Defaults
No	Cancel

7. Appendix B

Technical Parameter



Model	JNF1KLF- A/24V	JNF1K5LF- A/24V	JNF2KLF- A/24V	JNF3KLF- A/48V	JNF4KLF- A/48V	JNF5KLF- A/48V
PV Input						
Max. PV array input voltage	150Vdc	150Vdc	150Vdc	150Vdc	150Vdc	150Vdc
PV Input Power	1500W	1500W	1500W	3000W	3000W	4000W
MPPT Voltage Range	35~145Vdc	35~145Vdc	35~145Vdc	65~145Vdc	65~145Vdc	65~145Vdc
Battery						
Rated Voltage	24Vdc	24Vdc	24Vdc	48Vdc	48Vdc	48Vdc
Max.Charge Current	20A					
Efficiency	≥96%	≥96%	≥96%	≥97%	≥97%	≥97%
Inverter Output						
Rated Capacitor	500VA(L-N) /1000VA(L-L)	750VA(L-N) /1500VA(L-L)	1000VA(L-N) /2000VA(L-L)	1500VA(L-N) /3000VA(L-L)	2000VA(L-N) /4000VA(L-L)	2500VA(L-N) /5000VA(L-L)
Rated Power	400W(L-N) /800W(L-L)	600W(L-N) /1200W(L-L)	800W(L-N) /1600W(L-L)	1200W(L-N) /2400W(L-L)	1600W(L-N) /3200W(L-L)	2000W(L-N) /4000W(L-L)
Output Voltage	115Vac(L-N) /230Vac(L-L)	115Vac(L-N) /230Vac(L-L)	115Vac(L-N) /230Vac(L-L)	115Vac(L-N) /230Vac(L-L)	115Vac(L-N) /230Vac(L-L)	115Vac(L-N) /230Vac(L-L)
Rated Frequency	60Hz (±3%)					
Max.Efficiency	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%
Total Harmonic Distortion(THD)	<3%					
Rated Current	4.5A	7A	9A	13.5A	18A	22.5A
Current Peak Factor	3:01					
Overload	125% @rated power, 70s;150% @rated ,2s; 200% @rated ,5s;over 300% @rated,0s.					
AC Input						
AC input voltage	230Vac	230Vac	230Vac	230Vac	230Vac	230Vac

AC input frequency	60Hz ($\pm 3\%$)					
Max.charge current	20A					
Grid by-pass						
Allowed input voltage	115Vac $\pm 10\%$ /230Vac $\pm 20\%$					
Switching Time	<100ms					
Machanical Data						
Dimension(W /H/D)	485mm*365m m*235mm	485mm*365m m*235mm	485mm*365m m*235mm	485mm*365m m*235mm	485mm*365m m*235mm	500mm*365m m*235mm
Weight	17kg	18kg	27kg	28kg	30kg	35kg
Others						
Protection Level	IP22					
Noise	<50dB					
Cooling Method	Natural Cooling					
Operate Temp.	-20 \sim +50 $^{\circ}$ C					
Storage Temp.	-25 \sim +70 $^{\circ}$ C					
Status Indicator	LCD+LED					
Interface	RS485					
Elevation	2000m(>2000m derating operate)					

8. Appendix C

Inverter with charger fault feedback information table



Production information			
Model		Serial number	
Purchase time		Utility time	
Product usage			
Specific load model			
Fault information	Fault code		
	Fault phenomenon		
Fan condition	Fan runs or not		
	Fan operation		
Group string information	PV panel model		
	PV panel settings		
Storage battery information	Battery model		
	Battery configure		
After-sales service requirements			
Customers information			
Customer name		Contact details	
Address		Postal code	
Product improvement suggestion			

9. Appendix D

Quality assurance

The product malfunctions in the warranty period, Hefei Jntech new energy Co. Ltd.(referred to as our company) will be free maintenance or replacement of new product. The product warranty period shall be subject to the contract.

Evidence:

During the warranty period, the customer is requested to present invoices and date of purchase. Meanwhile, the trademark on the product shall be clearly visible, otherwise the quality guarantee shall not be guaranteed.

Conditions:

- The defective products after replacement should be returned to our company.
- The customer should give our company a reasonable time to fix the problem equipment.

Exemption From Liability

We do not give the guarantee for following condition:

- Damage in transport.
- Improperly installed, refitted, or used.
- The parts of the machine have exceeded the free warranty period.
- Operation beyond the very harsh environment which described in the user manual.
- Failure or damage of machinery caused by non Jntech company repair, replacement or disassembly .Damage caused by abnormal natural environment. Damage caused by abnormal natural environment.

Note:

If the product size and parameters are subject to change, subject to the latest information of our company without prior notice.

Contact us:

If you have any questions about this product, please feel free to contact us and we will be happy to help you with it. Please remember the following contact detail:



Address: No. 28 Taiyuan Road, Baohe Industrial Park, Hefei, 230051 Anhui, China.

Tel: + 86-551-62931312 (0323)

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